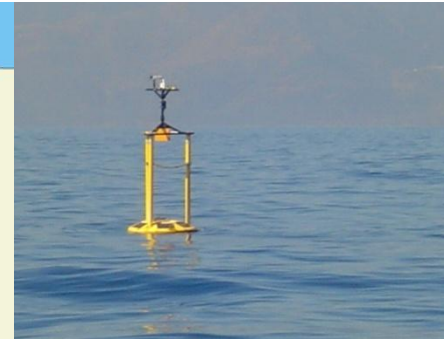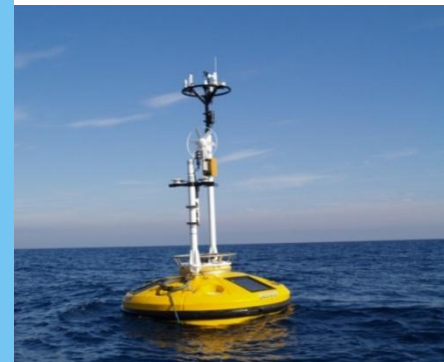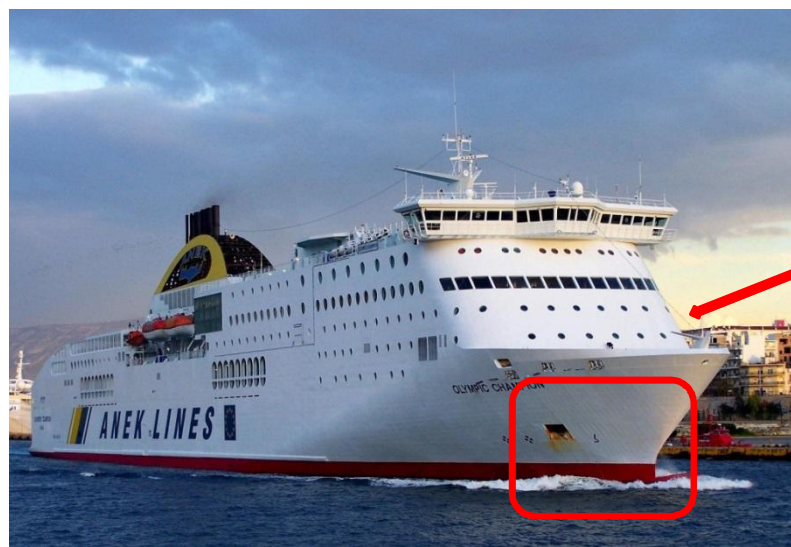# Poseidon System Ferrybox

SeaWatch buoys

surface parameters

The FB is the latest addition to the Poseidon System. The selected route meets two Poseidon stations/buoys.

Wavescan buoys

Supporting deep sea

monitoring including

ecosystem variables

Saronikos

M3A

Pireaus- Heraklio 150 n.m

Telemetry box installed on bow open deck.

Seawater output

Seawater input

High-Speed Ferry "Olympic Champion" covering the distance every night in 7 hours (speed > 20 knots). The FB is installed in the Bow thruster department 2 meters below the waterline.

Safety tank with water level detectors to control the pumps

HCMR FerryBox System

Ferry Box System I (-4H- JENA engineering GmbH) originally installed on "Kriti II" in the framework of MFSPP and MFSTEP projects . Rebuild and updated at 2012.

Temperature-
Conductivity (Thermo-
Salinometer FSI)
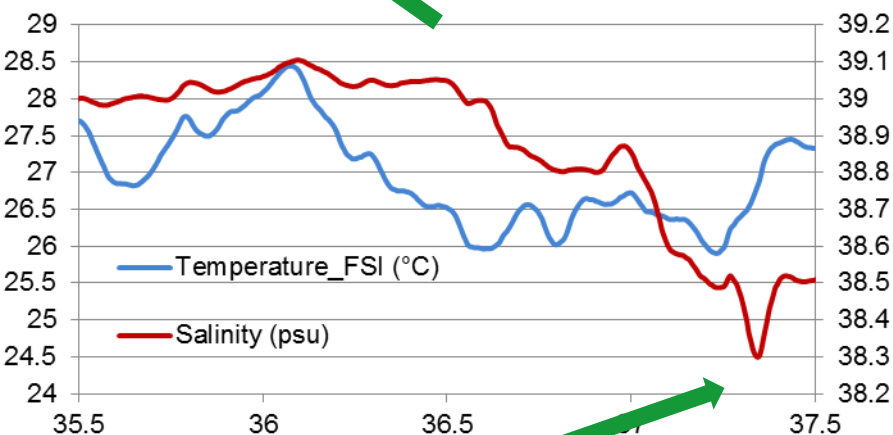
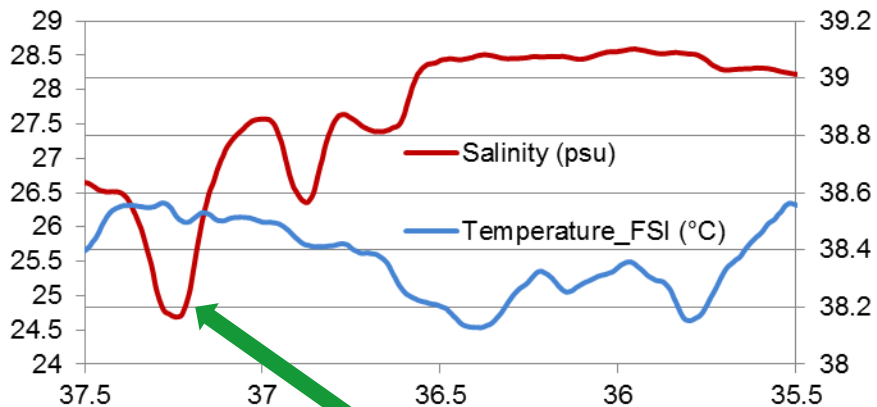Fluorescence-Turbidity
(Scufa II Turner Design)

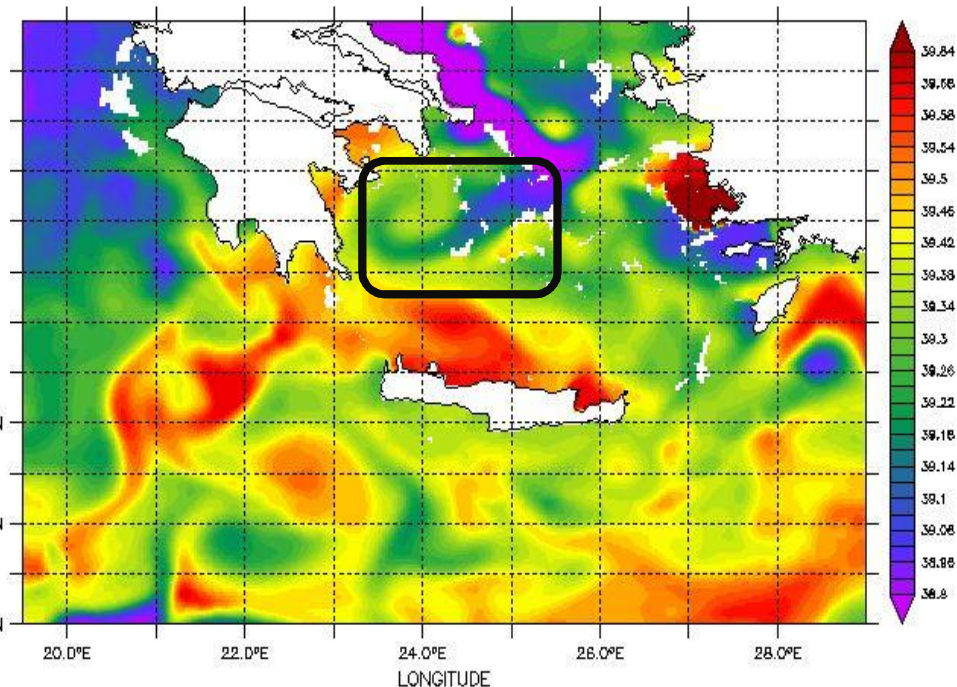Dissolved Oxygen
(Aanderaa optode)

pH (Meinsberg probe)

Temperature and Salinity observations

SEA WATER SALINITY (psu)

Surface Salinity Minimum: an indicator of Black Sea Water (BSW) flowing in the Aegean Sea.

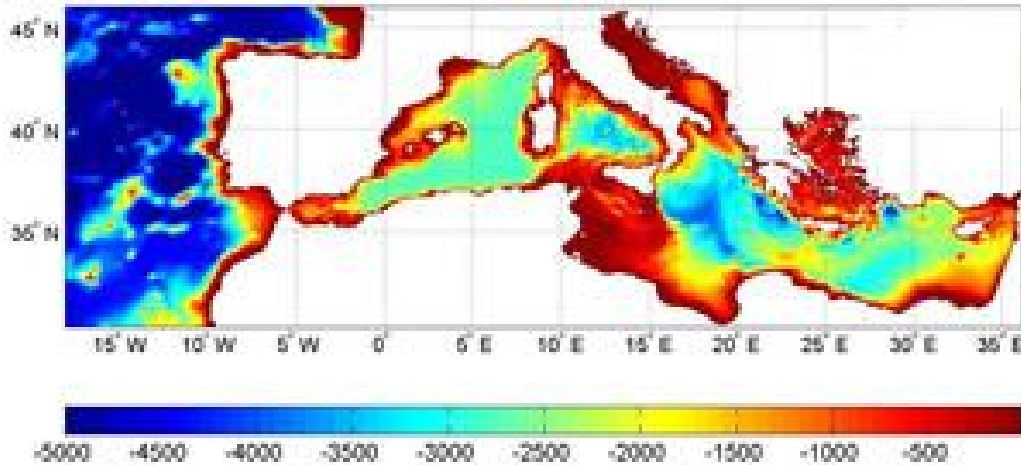*Assimilating Ferry Box data into the Aegean Sea model*

G. Korres[1], G. Petihakis[1], M. Ntoumas [1]
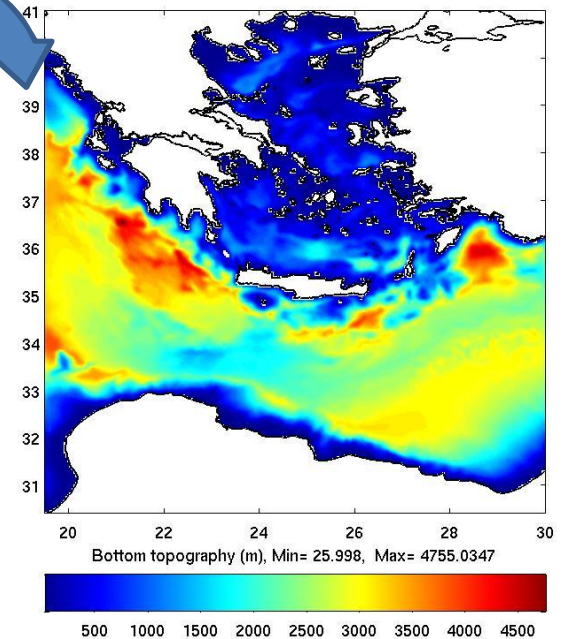*[1] Institute of Oceanography, Hellenic Centre for Marine research*

some preliminary results....

AEGEAN SEA MODEL

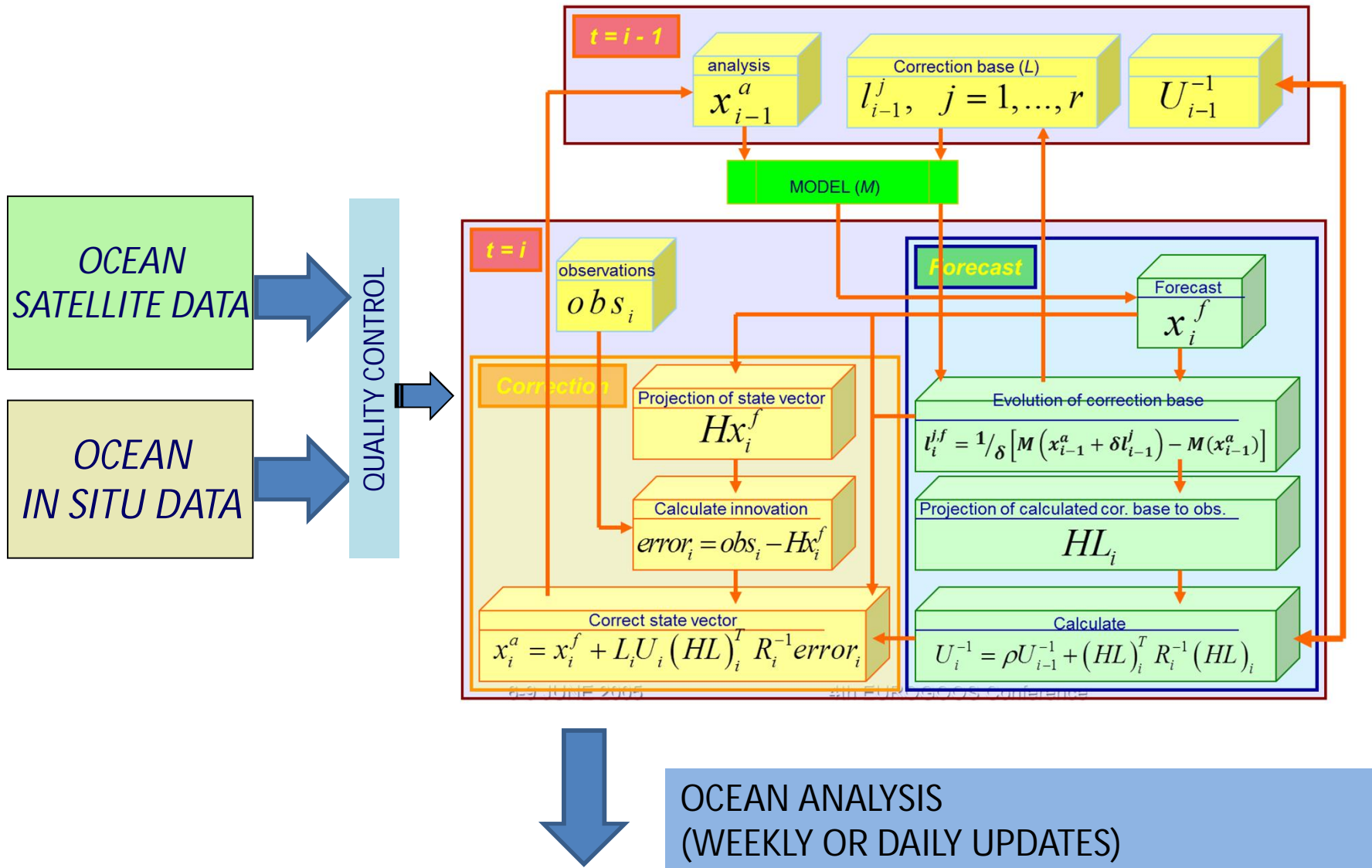## MFS MED 1/16 (OPA)

AEGEAN 1/30 (POM)

Bottom topography (m), Min= 25.998, Max= 4755.0347

➤Model: POM (Princeton Ocean Model)- 3D,SIGMA,FREE SURFACE
➤Domain: Aegean Sea 19.5E->30E & 30.4N->41N
➤Resolution: 1/30 x 1/30 & 24 sigma layers
➤OBC: MED MFS 1/16 (SYS2B) DAILY
➤Lateral Input: Rivers + Dardanelles outflow/inflow (climatology)
➤Surface Forcing: HCMR NON-HYDROSTATIC ETA 1/20 atmospheric forcing (hourly)
➤Surface Forcing: Bulk formulae (net shortwave + downward longwave radiation provided by ETA/HCMR atmospheric model). Freshwater flux boundary condition
➤Initialization method/fields: ANALYSIS (DATA ASSIMILATION)– ONCE A WEEK

The ocean data assimilation system of the Aegean Sea model

Localized SEEK filter with partial evolution of correction basis

Data Assimilation - SEEK Filter

$t = i - 1$

analysis
$$x^a_{i-1}$$

Correction base (L)
$$l^j_{i-1}, \quad j = 1, ..., r$$

$$U^{-1}_{i-1}$$

MODEL (M)

OCEAN SATELLITE DATA

OCEAN IN SITU DATA

QUALITY CONTROL

$t = i$

observations
$$obs_i$$

Forecast

Forecast
$$x^f_i$$

Correction

Projection of state vector
$$Hx^f_i$$

Evolution of correction base
$$l^{j,f}_i = {}^1\!/_\delta \left[M \left(x^a_{i-1} + \delta l^j_{i-1} \right) - M(x^a_{i-1}) \right]$$

Calculate innovation
$$error_i = obs_i - Hx^f_i$$

Projection of calculated cor. base to obs.
$$HL_i$$

Correct state vector
$$x^a_i = x^f_i + L_i U_i \left(HL \right)^T_i R^{-1}_i error_i$$

Calculate
$$U^{-1}_i = \rho U^{-1}_{i-1} + \left(HL \right)^T_i R^{-1}_i \left(HL \right)_i$$

6-9 JUNE 2005   4th EUROGOOS Conference

OCEAN ANALYSIS
(WEEKLY OR DAILY UPDATES)

ASSIMLIATION EXPERIMENTS FOR THE PERIOD AUG 2012 – JAN 2013

| NAME	PERIOD	ASSIM. DATA
CONTROL	14.08.12 – 31.01.13	SAT SSH & SST, ARGO T/S PROFILES (WEEKLY)
EXP1	14.08.12 – 31.01.13	SAT SSH & SST, ARGO T/S PROFILES (WEEKLY) + FERRYBOX SST (DAILY)

BOTH ASSIMILATION EXPERIMENTS (CONTROL & EXP1) ARE INITIALIZED FROM THE AEGEAN SEA MODEL OPERATIONAL RUN.

FERRYBOX SST DATA ARE MISSING FOR THE PERIOD 24.10.12 – 05.12.12 (SYSTEM MAINTENANCE)

FERRYBOX SST DATA ARE ASSIMILATED ON A DAILY BASIS
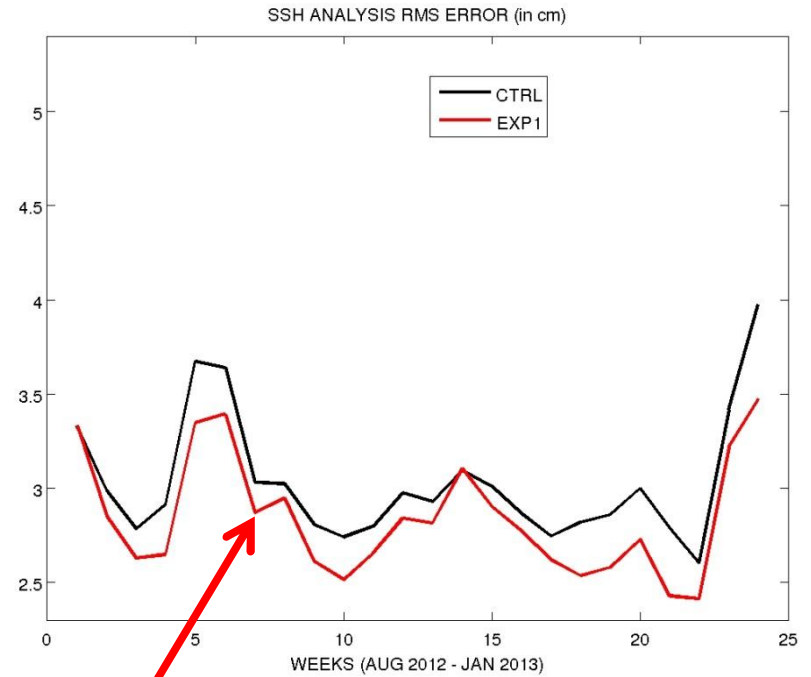
FERRYBOX SST RMS ERROR (CONTROL & EXP1)
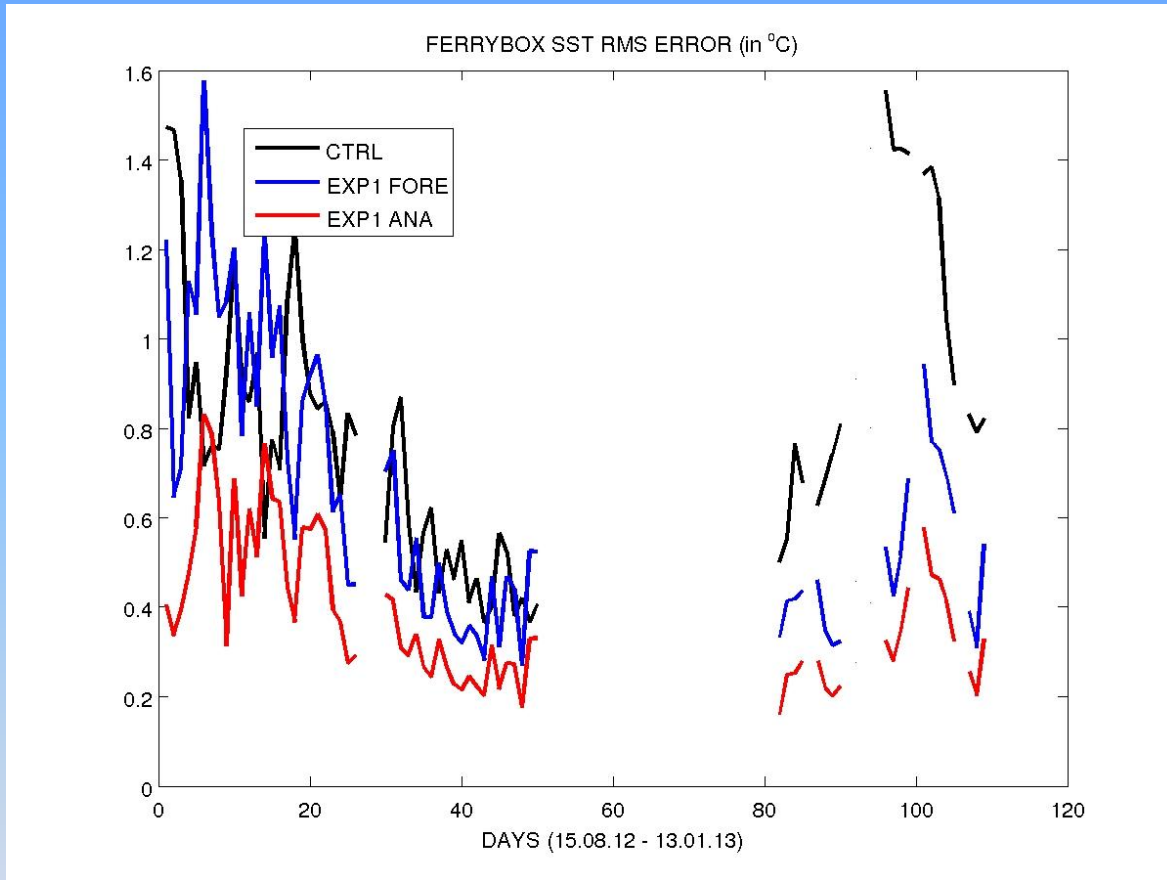
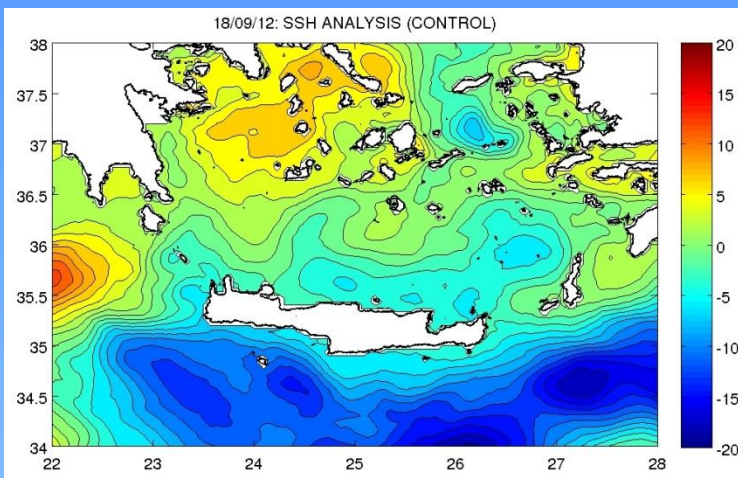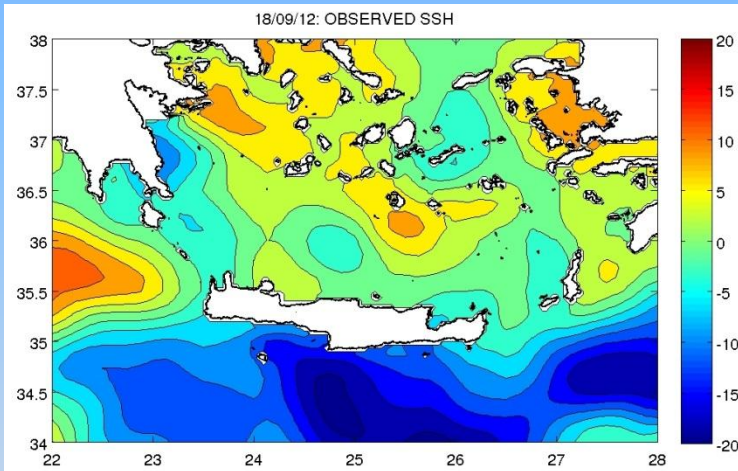# EFFECTS OF FERRYBOX SST DATA ASSIMILATION ON SEA SURFACE HEIGHT
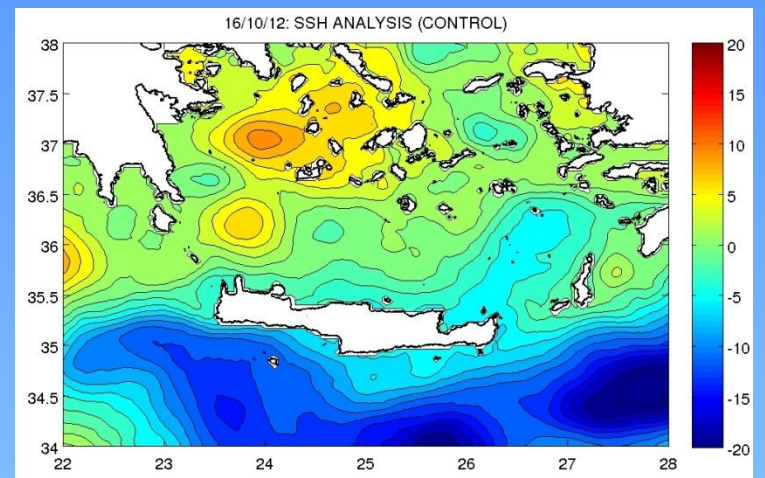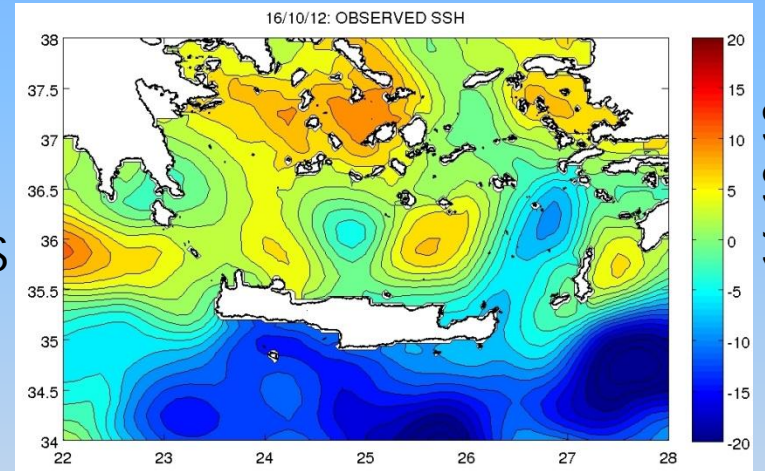
FORECAST RMS ERROR

ANALYSIS RMS ERROR

EXP1

18/09/12: SSH ANALYSIS (CONTROL)

16/10/12: SSH ANALYSIS (CONTROL)

18/09/12: OBSERVED SSH

16/10/12: OBSERVED SSH

18/09/12: SSH ANALYSIS (EXP1)
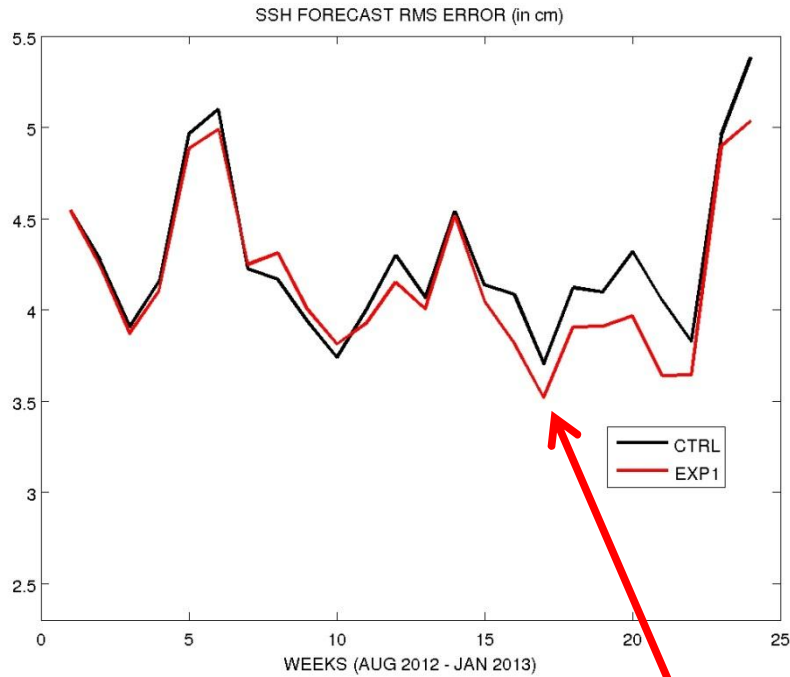
16/10/12: SSH ANALYSIS (EXP1)

CONTROL
ANALYSIS

SSH
OBSERVATIONS

EXP1
ANALYSIS

18.09.12

16.10.12